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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
CUTLIFF, YATE KAI RENE	

ART UNIT	PAPER NUMBER
1621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,224	NIELSEN ET AL.	
	Examiner	Art Unit	
	YATE' K. CUTLIFF	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 7 & 9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 7 & 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 July 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1 – 7 and 9 are pending.

Claim 8 has been canceled

Claims 1 – 7 and 9 are rejected.

Response to Amendment

2. The amendment to claim 1, submitted February 20, 2009 is acknowledged and entered.

Response to Arguments

3. Applicant's arguments, see pages 4 - 5, filed February 20, 2009, with respect to the rejection(s) of claim(s) 1-9 under 35 U.S.C. 103(a) have been fully considered and are persuasive in view of the amendments and arguments. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Stiles (US 4,562,174), Kaufman (US 263,893) Miller et al. (US 5,096,688) and further in view of Sie (US 5,216,034) or Konig et al. (US 5,631,302), as set out below.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stiles (US 4,562,174), in view of Kaufman (US 263,893), in view of Miller et al. (US 5,096,688) and further in view of Sie (US 5,216,034) or Konig et al. (US 5,631,302).

8. The rejected claims cover, inter alia, a process for production of methanol comprising, the conversion of a feed stream into a converted process stream in the presence of a catalyst active in the conversion of hydrogen, carbon monoxide and carbon dioxide into methanol; cooling of said converted process stream to a cooled process stream having a temperature of 20-200°C, which is lower than the converted

process stream; hydrogenation of the cooled process stream in the presence of methanol synthesis gas and a hydrogenation catalyst of copper, zinc and aluminum to produce a process stream rich in methanol and depleted in aldehyde and ketones; cooling of said hydrogenated process methanol-rich stream; phase separation of the cooled, condensed process stream into a gas phase and a liquid crude methanol; and purification of the liquid crude methanol by distillation of the alcohol formed in step (c). Dependent claims 2-5 further limit the process. Dependent claims 6, 7 and 9 disclose limitation for the hydrogenation catalyst.

9. Stiles teaches that the production of alcohols from synthesis gas, the common designation for mixtures of hydrogen, carbon monoxide and carbon dioxide, is a process which has been practiced since the early twentieth century. (see column 1, lines 14 – 17). An object of Stiles is to provide a catalytic process for the preparation of oxygenated compounds such as aldehydes and ketones simultaneously with the alcohols. However according to Stiles, if it is desired to convert the oxygenated compounds to alcohols to give a 100% alcohol product, a simple hydrogenation step can be preformed. (see column 3, lines 9 - 15). In Example 1, the methanol synthesis catalyst was a composition consisting of oxides of copper, zinc and aluminum.

10. The difference between Stiles and the claimed process is that Stiles does not disclose the following: a temperature of the cooled process stream to be lower than the converted process stream; a multi-step process for making methanol from synthesis gases (i.e. conversion of synthesis gases and hydrogenation of aldehydes and ketone); the hydrogenation catalyst being composed of copper, zinc, aluminum and methanol

synthesis gas; purification by distillation; copper content of the hydrogenation catalyst; and the form and shape of the hydrogenation catalyst.

11. However, the process of Kaufman supports the fact that it was known that hydrogen and oxides of carbon (i.e. dioxides and monoxides) may be made to react exothermically in the presence of certain catalyst to form hydrocarbons having more than one carbon atom per molecule and oxygenated organic compounds comprising alcohols, aldehydes and ketones. (see column 1, lines 17-30 & column 2, lines 4 - 9). Additonally, the reaction effluent from the hydrogenation of an oxide of carbon is obtained in a vapor state in the form of reactor outlet gases, which are passed through a condensation zone to be cooled to temperatures within the range of 40 to 105°F (4.4 to 65.5°C). The cooling produces a condensate that is separated into a hydrocarbon-rich phase, a water-rich phase and an uncondensed gas phase, with each phase containing the oxygenated compounds. Kaufman states that in order to separate the oxygenated compounds formed that it was highly desirable to simplify the recovery by converting the total chemical into alcohols to prevent having to conduct a series of diversified treatments. (see column 2, lines 10 - 31). The teachings of Kaufman disclose a process for hydrogenation of the aldehyde and ketones, obtained as products from the hydrogenation of oxides of carbon, to their corresponding alcohols. (see column 1, lines 5 – 16).

12. The difference between Kaufman and the claimed process is that Kaufman doe not disclose that the hydrogenation catalyst is composed of copper, zinc, aluminum and

methanol synthesis gas; purification by distillation; the content of the copper of the hydrogenation catalyst; and the form and shape of the hydrogenation catalyst.

13. However, Miller et al. discloses a process for producing higher alcohols from synthesis gas that is a two stage process. (see abstract). In the disclosure of Miller et al. it was stated that the art teaches that low temperature methanol synthesis catalysts have been modified for higher alcohol synthesis by the addition of alkali metals usually containing both copper and zinc and may contain oxides of chromium or aluminum. (see column 1, lines 55 - 59). In Miller et al. the first stage converts synthesis gas to water, unsaturated organic oxygenates having 2 or more carbon atoms per molecule and higher alcohols with a conversion catalyst. The term unsaturated organic oxygenates denotes non-alcohol oxygenates such as carboxylic acids, aldehydes, ketones and esters. (see column 4, lines 12 – 23). The second stage of Miller et al. uses a copper containing catalyst as the second catalyst to convert the at least a portion of the unsaturated organic oxygenates, in the effluent, to alcohol. (see column 3, lines 10 – 16). In Miller et al. it was stated that the second catalyst (copper) served to upgrade the product from synthesis gas conversion. (see column 6, lines 27 - 30). Typical examples of the second catalyst used can be a ternary mixture of Cu-Zn-Cr and Cu-Zn--Al. (see column 6, lines 39-43). Additonally, it was stated that the Cu/Zn atomic ration in such a catalyst can range about 0.3 to 2.5 with alumina as a structural component present in range of 2 to 35 mole%. (see column 6, lines 60 - 64). The reaction process of Miller et al. uses a conversion catalyst to convert synthesis gas to linear higher alcohols with the remainder of the product containing water, unconverted

synthesis gas, unsaturated organic oxygenates and methanol. The product from conversion with the first catalyst is contacted with the copper-containing catalyst in order upgrade the liquid product by hydrogenating undesirable oxygenates to convert them to alcohols. (see column 3, lines 34 - 44). The reaction process of Miller et al. may take place in the same reactor using identical or similar reaction conditions of different conditions. Alternatively, in Miller et al. the two catalysts may be disposed in series in separate reactors. (see column 8, lines 6 - 10).

The two main process steps of Applicant's claimed invention, conversion of a synthesis gas to methanol and catalytic hydrogenation of the reaction products of conversion reaction, using catalyst containing copper, zinc, aluminum and methanol synthesis gas are, are disclosed in the combination references of Stiles Kaufman and Miller et al.; in addition to some of the other processing steps (i.e. cooling the product streams of both reactions). The only differences between the claimed invention and the references are the combination and order of the "old processing steps for first conversion of the synthesis gas and then catalytic hydrogenation of the aldehyde and ketone of the effluent from the first conversion to alcohol" in the processing sequence. It would have been obvious at the time of Applicant's claimed invention to prepare methanol from the conversion of synthesis gases and then subject the reaction products to hydrogenation to convert the by-products of aldehyde and ketone to alcohol as suggested by Stiles in view of the teachings of Kaufman and Miller et al. Motivation for the hydrogenation step is suggested by each reference, which is to increase the alcohol yield in the end product.

Therefore, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. KSR International Co. v. Teleflex Inc., 550 U.S. ___, 82 USPQ2d 1385 (U.S. 2007).

14. With regard to the use of purification by distillation, this purification method is taught by Konig et al. (see column 3, lines 60-61).

15. With regard to use of a series of reactors in the methanol synthesis process the Examiner turned to the teaching of Sie and Konig et al., each teaching the use of a series of reactors that invariably incorporate a means of heat exchangers or cooling mechanisms.

Therefore, these limitations are deemed to be obvious absent a showing of unexpected results.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. *(In reOpprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976). In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35USC 103(a). From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one

of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

16. With regard to the shape or form of the catalyst it is not unobvious, since one of ordinary skill in the art would have found it commonplace to utilize the catalyst, suitable for his purposes, which are found to exhibit the utility as catalyst well-known in his craft. Therefore, absent a showing of criticality and unexpected beneficial results, the catalyst shape or form is part of the artisan's routine of experimentation.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YATE' K. CUTLIFF whose telephone number is (571)272-9067. The examiner can normally be reached on M-TH 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel M. Sullivan can be reached on (571) 272 - 0779. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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